

Q1] Write a program to implement following functions in numpy library Array, arange, len, ndim, slicing, copy, view, reshape, concatenate, split

```
import numpy as np

# Array function
def my_array(arr_list):
    return np.array(arr_list)

# arange function
def my_arange(start, stop, step=1):
    return np.arange(start, stop, step)

# len function
def my_len(arr):
    return len(arr)

# ndim function
def my_ndim(arr):
    return arr.ndim

# slicing function
def my_slicing(arr, start=None, stop=None, step=None):
    return arr[start:stop:step]

# copy function
def my_copy(arr):
    return arr.copy()

# view function
def my_view(arr):
    return arr.view()

# reshape function
def my_reshape(arr, shape):
    if np.prod(shape) != np.prod(arr.shape):
        raise ValueError("Cannot reshape array into the specified shape")
    return arr.reshape(shape)

# concatenate function
def my_concatenate(arr1, arr2, axis=0):
    return np.concatenate((arr1, arr2), axis=axis)

# split function
```

```
def my_split(arr, indices, axis=0):
    return np.split(arr, indices, axis=axis)

# Testing the functions

arr1 = my_array([1, 2, 3, 4, 5])
arr2 = my_array([6, 7, 8, 9, 10])

print("Array:")
print(arr1)

print("\narange:")
print(my_arange(0, 10, 2))

print("\nlen:")
print(my_len(arr1))

print("\nndim:")
print(my_ndim(arr1))

print("\nslicing:")
print(my_slicing(arr1, 1, 4, 1))

print("\ncopy:")
arr1_copy = my_copy(arr1)
print(arr1_copy)

print("\nview:")
arr1_view = my_view(arr1)
print(arr1_view)

print("\nreshape:")
arr1_reshaped = my_reshape(arr1, (1, 5)) # Corrected reshape to (1, 5)
print(arr1_reshaped)

print("\nconcatenate:")
print(my_concatenate(arr1, arr2))

print("\nsplit:")
arr_split = my_split(arr1, [2, 4]) # Split into parts of sizes [2, 3]
print(arr_split)
```

Output:

```
In [4]: runfile('D:/python/numpy_lib.py', wdir='D:/python')
Array:
[1 2 3 4 5]

arange:
[0 2 4 6 8]

len:
5

ndim:
1

slicing:
[2 3 4]

copy:
[1 2 3 4 5]

view:
[1 2 3 4 5]

reshape:
[[1 2 3 4 5]]
```

```
reshape:
[[1 2 3 4 5]]

concatenate:
[ 1  2  3  4  5  6  7  8  9 10]

split:
[array([1, 2]), array([3, 4]), array([5])]

In [5]:
```

Q2] Write a program to implement following functions in pandas library DataFrame, dropna, fillna, replace specific values

```
import pandas as pd
import numpy as np
# DataFrame function
def my_dataframe(data_dict):
    return pd.DataFrame(data_dict)
# dropna function
def my_dropna(df):
    return df.dropna()
# fillna function
def my_fillna(df, value):
    return df.fillna(value)
# replace function
def my_replace(df, old_value, new_value):
    return df.replace(old_value, new_value)
# Testing the functions
data = {'A': [1, 2, np.nan, 4],
        'B': [5, np.nan, 7, 8],
        'C': [9, 10, 11, 12]}
df = my_dataframe(data)
print("Original DataFrame:")
print(df)
print("\ndropna:")
print(my_dropna(df))
print("\nfillna:")
print(my_fillna(df, 0))
print("\nreplace:")
print(my_replace(df, 2, 20))
Output:
```

```
In [5]: runfile('D:/python/panda_lib.py', wdir='D:/python')
Original DataFrame:
```

	A	B	C
0	1.0	5.0	9
1	2.0	NaN	10
2	NaN	7.0	11
3	4.0	8.0	12

```
dropna:
```

	A	B	C
0	1.0	5.0	9
3	4.0	8.0	12

```
fillna:
```

	A	B	C
0	1.0	5.0	9
1	2.0	0.0	10
2	0.0	7.0	11
3	4.0	8.0	12

```
replace:
```

	A	B	C
0	1.0	5.0	9
1	20.0	NaN	10
2	NaN	7.0	11
3	4.0	8.0	12

```
In [6]:
```

Q3] Write a program to implement following graphs in matplotlib library Line chart, bar chart, scatterplot, pie chart, histogram

```
import matplotlib.pyplot as plt

import numpy as np

# Create sample data
x = np.arange(1, 11)
y = np.array([2, 4, 6, 8, 10, 12, 14, 16, 18, 20])

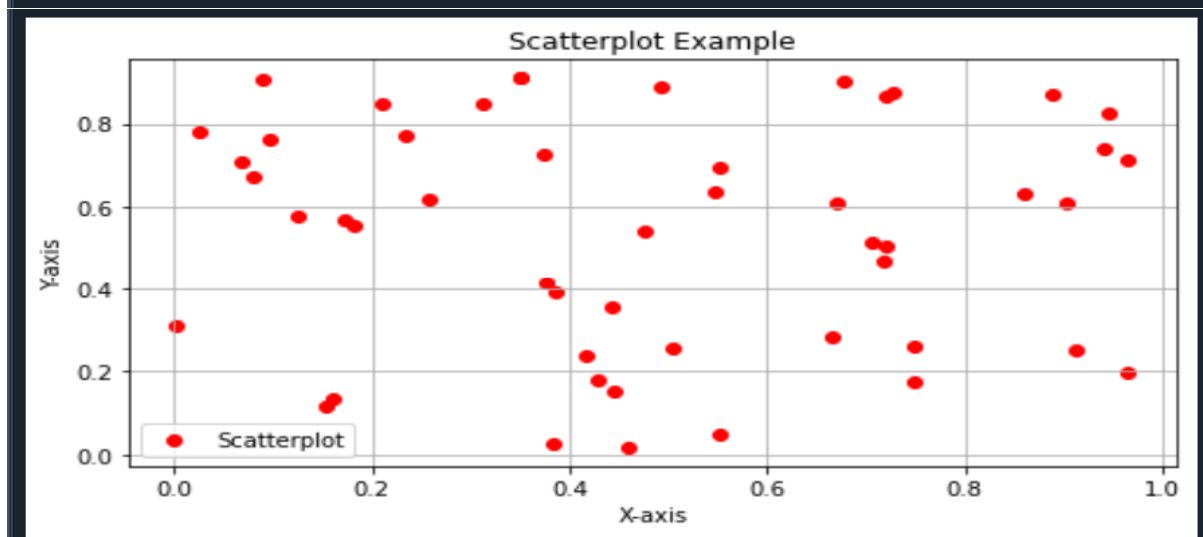
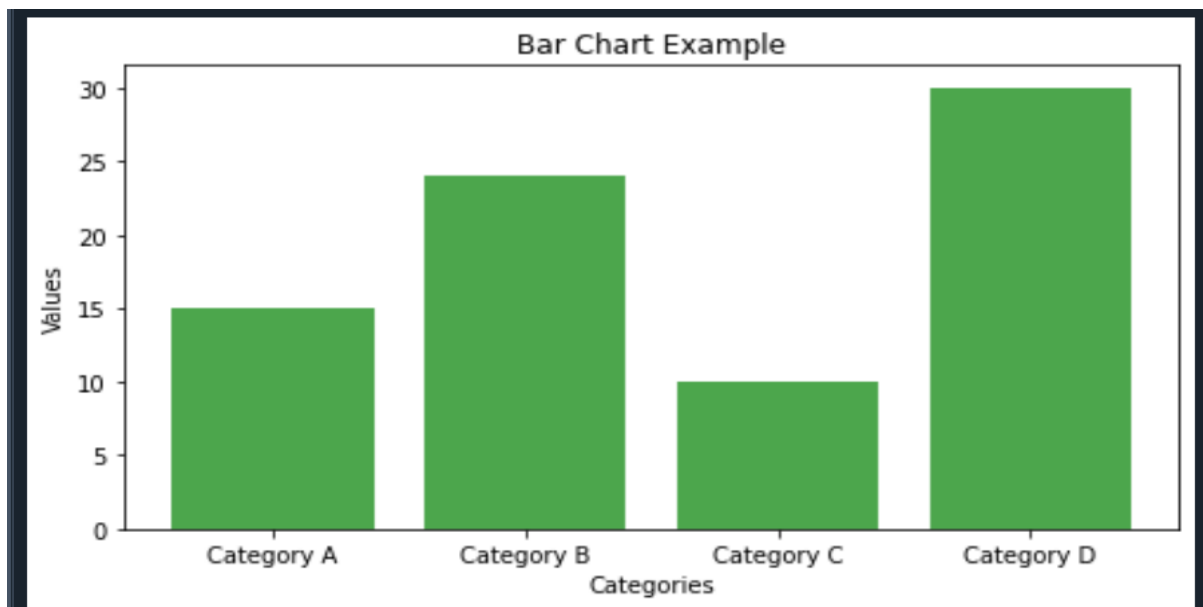
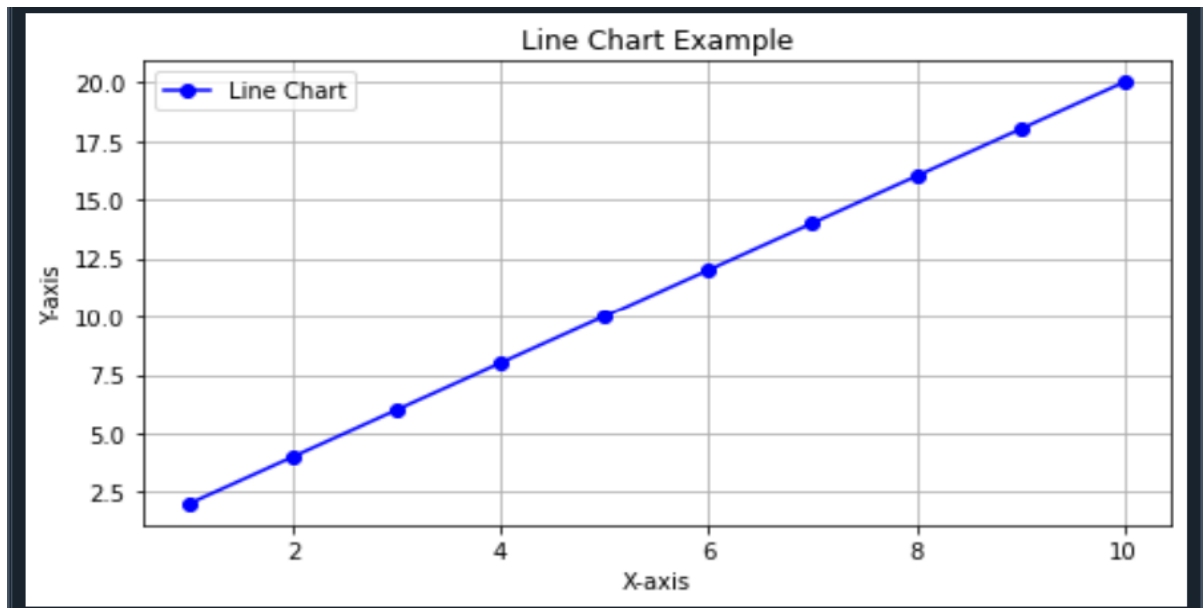
# Line Chart
plt.figure(figsize=(8, 4))
plt.plot(x, y, marker='o', linestyle='-', color='b', label='Line Chart')
plt.xlabel('X-axis')
plt.ylabel('Y-axis')
plt.title('Line Chart Example')
plt.legend()
plt.grid(True)
plt.show()

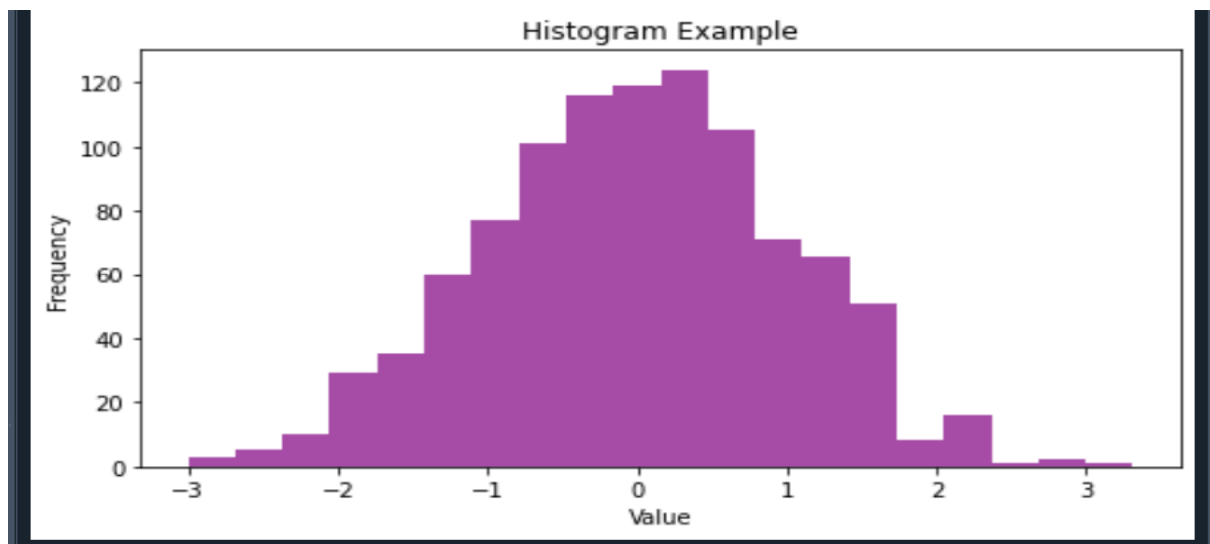
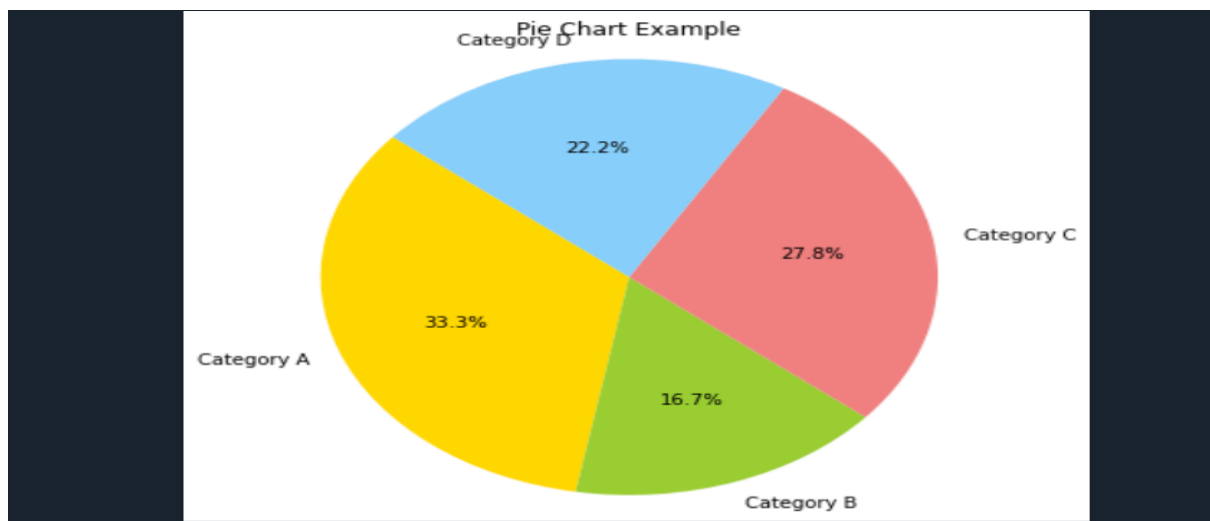
# Bar Chart
categories = ['Category A', 'Category B', 'Category C', 'Category D']
values = [15, 24, 10, 30]
plt.figure(figsize=(8, 4))
plt.bar(categories, values, color='g', alpha=0.7)
plt.xlabel('Categories')
plt.ylabel('Values')
plt.title('Bar Chart Example')
plt.show()

# Scatterplot
x = np.random.rand(50)
y = np.random.rand(50)
plt.figure(figsize=(8, 4))
plt.scatter(x, y, c='r', marker='o', label='Scatterplot')
plt.xlabel('X-axis')
plt.ylabel('Y-axis')
plt.title('Scatterplot Example')
```

```
plt.legend()
plt.grid(True)
plt.show()
# Pie Chart
labels = ['Category A', 'Category B', 'Category C', 'Category D']
sizes = [30, 15, 25, 20]
colors = ['gold', 'yellowgreen', 'lightcoral', 'lightskyblue']
plt.figure(figsize=(6, 6))
plt.pie(sizes, labels=labels, colors=colors, autopct='%1.1f%%', startangle=140)
plt.axis('equal')
plt.title('Pie Chart Example')
plt.show()
# Histogram
data = np.random.randn(1000)
plt.figure(figsize=(8, 4))
plt.hist(data, bins=20, color='purple', alpha=0.7)
plt.xlabel('Value')
plt.ylabel('Frequency')
plt.title('Histogram Example')
plt.show()
```

Output:





Q4] Write a program to find the correlation matrix

```
import pandas as pd
# Sample dataset
data = {
    'A': [1, 2, 3, 4, 5],
    'B': [2, 4, 1, 6, 8],
    'C': [5, 7, 3, 8, 9],
    'D': [1, 2, 3, 2, 1]
}
# Create a DataFrame
df = pd.DataFrame(data)
# Calculate the correlation matrix
correlation_matrix = df.corr()
# Display the correlation matrix
print("Correlation Matrix:")
print(correlation_matrix)
```

Output:

```
In [7]: runfile('D:/python/pandas_lib4.py', wdir='D:/python')
Correlation Matrix:
           A         B         C         D
A  1.000000  0.773021  0.590879  0.000000
B  0.773021  1.000000  0.964275 -0.500870
C  0.590879  0.964275  1.000000 -0.570735
D  0.000000 -0.500870 -0.570735  1.000000

In [8]:
```

Q5] Create an Android application and understand the Project and file hierarchy.

Activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>

<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"

    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <TextView

        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello World!"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.36" />

    <TextView

        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="This is First program!"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.483" />

</androidx.constraintlayout.widget.ConstraintLayout>
```

Mainactivity.java:

```
package com.example.helloworld;
```

```
import androidx.appcompat.app.AppCompatActivity;
```

```
import android.os.Bundle;
```

```
public class MainActivity extends AppCompatActivity {
```

```
    @Override
```

```
    protected void onCreate(Bundle savedInstanceState) {
```

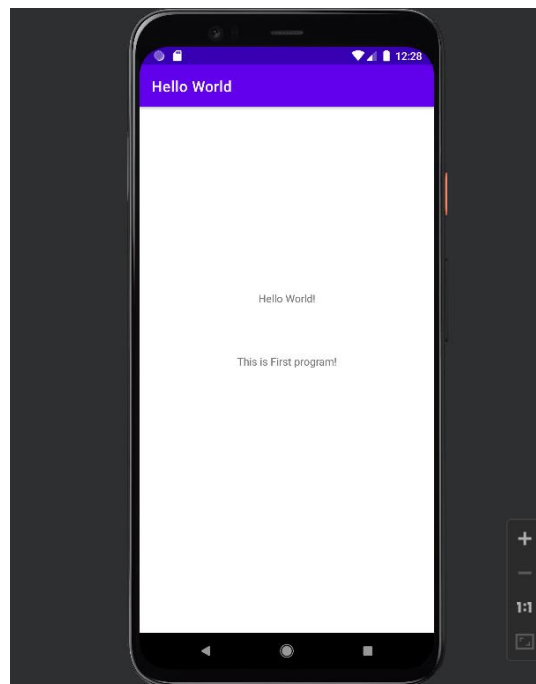
```
        super.onCreate(savedInstanceState);
```

```
        setContentView(R.layout.activity_main);
```

```
    }
```

```
}
```

Output:



Q6] Develop an Android application that uses GUI components, Font and Colors

Activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>

<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"

    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <CheckBox
        android:id="@+id/cb1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="36dp"
        android:text="Java"
        android:textColor="#A6680B"
        android:fontFamily="sans-serif-light"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.09" />

    <CheckBox
        android:id="@+id/cb2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="36dp"
        android:text="DSA"
        android:textColor="#A6680B"
        android:fontFamily="sans-serif-light"
        app:layout_constraintBottom_toBottomOf="parent"
```

```
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toTopOf="parent"
app:layout_constraintVertical_bias="0.175" />
```

<CheckBox

```
android:id="@+id/cb3"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="36dp"
android:layout_marginTop="4dp"
android:text="JavaScript"
android:textColor="#A6680B"
android:fontFamily="sans-serif-light"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toTopOf="parent" />
```

<Button

```
android:id="@+id/btn"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:layout_margin="50sp"
android:background="@color/black"
android:text="Selected Languages"
app:layout_constraintBottom_toBottomOf="parent"
app:layout_constraintTop_toTopOf="parent"
app:layout_constraintVertical_bias="0.245"
tools:layout_editor_absoluteX="16dp" />
```

<Button

```
android:id="@+id/clr"
android:layout_width="match_parent"
android:layout_height="wrap_content"
```

```
android:layout_margin="50sp"
android:background="@color/black"
android:text="Clear"
app:layout_constraintBottom_toBottomOf="parent"
app:layout_constraintTop_toTopOf="parent"
app:layout_constraintVertical_bias="0.448"
tools:layout_editor_absoluteX="16dp" />
```

<TextView

```
android:id="@+id/txtv1"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text=""
android:textColor="#FF3700B3"
android:textSize="30dp"
app:layout_constraintBottom_toBottomOf="parent"
app:layout_constraintTop_toTopOf="parent"
app:layout_constraintVertical_bias="0.691"
tools:layout_editor_absoluteX="0dp" />
```

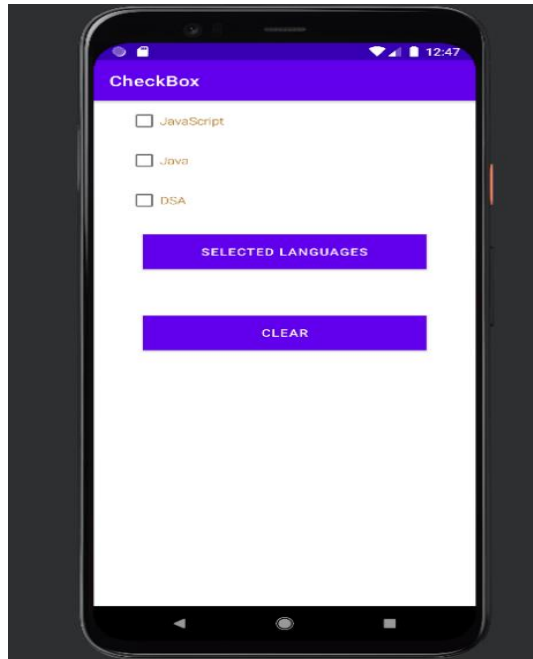
</androidx.constraintlayout.widget.ConstraintLayout>

Mainactivity.java:

@Override

```
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
}
```

Output:



Q7] Develop an Android application that uses Layout Managers

Activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>

<RelativeLayout

    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_height="match_parent"
    android:layout_width="match_parent"
    tools:context=".MainActivity">

    <TextView

        android:id="@+id/firstNumberLabel"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Enter First Number:"
        android:layout_alignParentStart="true"
        android:layout_alignParentTop="true"
        android:layout_marginEnd="8dp"/>

    <EditText

        android:id="@+id/firstNumberEditText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_toEndOf="@+id/firstNumberLabel"
        android:layout_alignBaseline="@+id/firstNumberLabel"
        android:hint="Enter the first number"/>

    <TextView

        android:id="@+id/secondNumberLabel"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Enter Second Number:"
        android:layout_below="@+id/firstNumberLabel"
        android:layout_alignStart="@+id/firstNumberLabel"
        android:layout_marginTop="16dp"
```

```
        android:layout_marginEnd="8dp"/>
<EditText
    android:id="@+id/secondNumberEditText"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_toEndOf="@+id/secondNumberLabel"
    android:layout_alignBaseline="@+id/secondNumberLabel"
    android:hint="Enter the second number"/>
<Button
    android:id="@+id/multiplyButton"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Multiply"
    android:layout_centerHorizontal="true"
    android:layout_below="@+id/secondNumberLabel"
    android:layout_marginTop="16dp"/>
<TextView
    android:id="@+id/resultTextView"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text=""
    android:layout_centerHorizontal="true"
    android:layout_below="@+id/multiplyButton"
    android:layout_marginTop="16dp"/>
</RelativeLayout>
```

Mainactivity.java:

```
package com.example.layouts1;

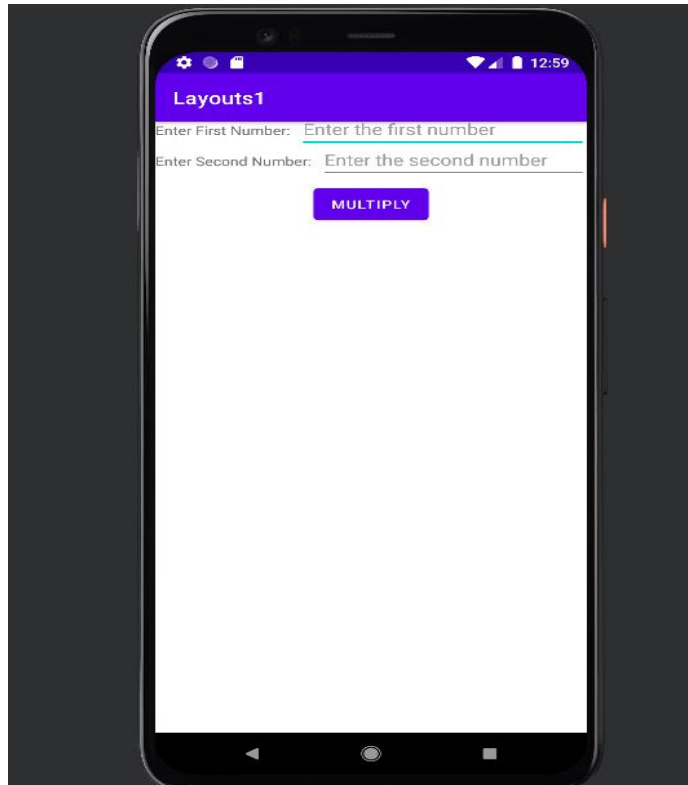
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;

public class MainActivity extends AppCompatActivity {

    @Override
```

```
protected void onCreate(Bundle savedInstanceState) {  
    super.onCreate(savedInstanceState);  
    setContentView(R.layout.activity_main);  
}  
}
```

Output:



Q8] Develop an Android application that uses Layout Managers Login Form

Activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>

<LinearLayout

    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp">

    <EditText

        android:id="@+id/et_username"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Username"/>

    <EditText

        android:id="@+id/et_password"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Password"
        android:inputType="textPassword"/>

    <Button

        android:id="@+id/btn_show_toast"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Login"
        android:layout_gravity="center"/>

</LinearLayout>
```

Mainactivity.java:

```
package com.example.layoutloginform;

import androidx.appcompat.app.AppCompatActivity;
```

```
import android.os.Bundle;
```

```
public class MainActivity extends AppCompatActivity {
```

```
    @Override
```

```
    protected void onCreate(Bundle savedInstanceState) {
```

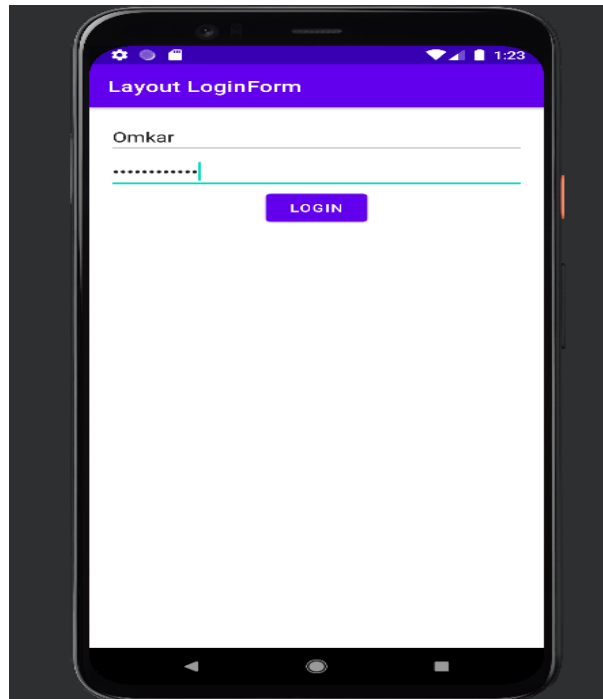
```
        super.onCreate(savedInstanceState);
```

```
        setContentView(R.layout.activity_main);
```

```
    }
```

```
}
```

Output:



Q9] Develop an Android application that uses Layout Managers and event listeners.

Registration form

Activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>

<LinearLayout

    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp">

    <EditText

        android:id="@+id/etName"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Full Name" />

    <EditText

        android:id="@+id/etEmail"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Email Address" />

    <EditText

        android:id="@+id/etPassword"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Password"
        android:inputType="textPassword" />

    <Button

        android:id="@+id/btnRegister"
        android:layout_width="match_parent"
```

```
        android:layout_height="wrap_content"
        android:text="Register" />
</LinearLayout>
```

Mainactivity.java:

```
package com.example.registrationform;

import androidx.appcompat.app.AppCompatActivity;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import android.os.Bundle;

public class MainActivity extends AppCompatActivity {
    private EditText etName, etEmail, etPassword;
    private Button btnRegister;

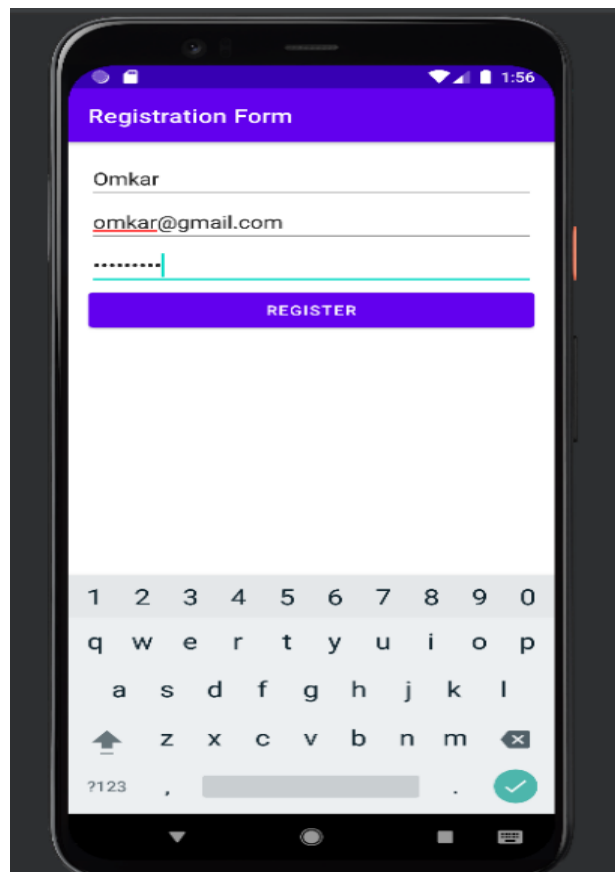
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        etName = findViewById(R.id.etName);
        etEmail = findViewById(R.id.etEmail);
        etPassword = findViewById(R.id.etPassword);
        btnRegister = findViewById(R.id.btnRegister);

        btnRegister.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String name = etName.getText().toString();
```

```
String email = etEmail.getText().toString();  
String password = etPassword.getText().toString();  
  
String message = "Name: " + name + "\nEmail: " + email + "\nPassword: " + password;  
Toast.makeText(MainActivity.this, message, Toast.LENGTH_LONG).show();  
}  
});  
}  
}
```

Output:



**Q10] Develop an Android application that uses Layout Managers and event listeners.
Subscription form and Login form.**

Activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
```

```
<LinearLayout
```

```
    xmlns:android="http://schemas.android.com/apk/res/android"
```

```
    android:id="@+id/subscriptionLayout"
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="match_parent"
```

```
    android:orientation="vertical"
```

```
    android:padding="16dp">
```

```
<!-- Subscription Form -->
```

```
<EditText
```

```
    android:id="@+id/etSubscriptionEmail"
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="wrap_content"
```

```
    android:hint="Email Address" />
```

```
<Button
```

```
    android:id="@+id/btnSubscribe"
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="wrap_content"
```

```
    android:text="Subscribe" />
```

```
<!-- Login Form -->
```

```
<LinearLayout
```

```
    android:id="@+id/loginLayout"
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="wrap_content"
```

```
    android:layout_marginTop="16dp"
```

```
    android:orientation="vertical">
```

```
<EditText
    android:id="@+id/etLoginUsername"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Username" />
```

```
<EditText
    android:id="@+id/etLoginPassword"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Password"
    android:inputType="textPassword" />
```

```
<Button
    android:id="@+id/btnLogin"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Login" />
```

```
</LinearLayout>
```

```
</LinearLayout>
```

Mainactivity.java:

```
package com.example.suscriptionform;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
```

```
public class MainActivity extends AppCompatActivity {

    private EditText etSubscriptionEmail, etLoginUsername, etLoginPassword;
    private Button btnSubscribe, btnLogin;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        etSubscriptionEmail = findViewById(R.id.etSubscriptionEmail);
        btnSubscribe = findViewById(R.id.btnSubscribe);

        etLoginUsername = findViewById(R.id.etLoginUsername);
        etLoginPassword = findViewById(R.id.etLoginPassword);
        btnLogin = findViewById(R.id.btnLogin);

        btnSubscribe.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                // Handle subscription logic here

                String email = etSubscriptionEmail.getText().toString();
                String message = "Subscribed with email: " + email;
                Toast.makeText(MainActivity.this, message, Toast.LENGTH_LONG).show();
            }
        });

        btnLogin.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                // Handle login logic here

                String username = etLoginUsername.getText().toString();
```

```
String password = etLoginPassword.getText().toString();

// Display a toast message for login

String message = "Logged in as: " + username;

Toast.makeText(MainActivity.this, message, Toast.LENGTH_LONG).show();

    }

});

}

}
```

Output:

